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is used in the arts. A seventh chapter (incomplete) is to describe the microscopic characters of the most widely used woods.—C. R. B.

THE LAST ISSUE of the *Minnesota Botanical Studies* (**2**: 537–655. 1901) contains the following papers: E. M. FREEMAN, "A preliminary list of Minnesota Uredineae," a little over 100 species being included; DEALTON SAUNDERS, "A new species of Alaria," from the Californian coast; F. K. BUTTEN, "A preliminary list of Minnesota Xylariaceae," including 19 species; W. A. WHEELER, "A contribution to the knowledge of the flora of the Red river valley in Minnesota," 325 species being listed, with eight excellent heliotype plates of plant formations; H. B. HUMPHREY, "Observations on *Gigartina exasperata* Harv.," a histological study, with one heliotype plate; W. G. FANNING, "Observations on the algae of the St. Paul city water;" W. A. WHEELER, "Notes on some plants of Isle Royale;" D. LANGE, "Revegetation of Trestle island;" J. C. ARTHUR and E. W. D. HOLWAY, "Violet rusts of North America," with one plate; H. L. LYON, "Observations on the embryogeny of Nelumbo" with three plates, reviewed in the BOTANICAL GAZETTE for October.—J. M. C.

THAT FIRES are not always so detrimental as they seem is disclosed by a reading of the second edition of the phytogeography of Nebraska.[10] The first edition has been reviewed in this journal,[11] and a statement as to the new material is all that is needed here. A comparison of the two editions shows that the entire book has been essentially revised and brought up to date, although the table of contents reads much the same in the two editions. Among the more important additions are a full discussion of methods for the determination of the frequence and abundance of species, a brief treatment of the primitive flora of the great plains, and the treatment of floral and vegetation elements and of accessory biological characters. Throughout the detailed chapters on the formations, much new material, the result of three years' further labor, is added. In the review of the first edition, the importance of this contribution to ecological workers was stated. Now that the book has been in actual use for four years, it is possible to speak yet more highly of its value. It is not too much to say that it is the most important and valuable work that has yet appeared in the field of American phytogeography.—H. C. COWLES.

## NOTES FOR STUDENTS

S. YAMANOUCHI[12] has described and figured bodies in the dividing pollen mother cell of *Lilium longiflorum*, which stain deeply, are centers of radiation, and come to occupy a position at the poles of the nuclear spindle. He regards them as undoubtedly centrosomes.—J. M. C.

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[10] POUND, ROSCOE, and CLEMENTS, FREDERIC E.—The phytogeography of Nebraska. I. General Survey. 8vo. pp. 442, with four maps. Lincoln, Nebraska: The University Publishing Co. 1900. Second edition.

[11] BOT. GAZ. **25**: 370. 1898.

[12] Einige Beobachtungen über die Centrosomen in den Pollenmutterzellen von *Lilium longifolium*. Beihefte Bot. Centralbl. **10**: 310–303. *pl. 1.* 1901.

MISS MARIA DAWSON reports the results of three years' experimentation to determine the economic importance of nitragin, the commercial culture of the nodule organisms of Leguminosae. Her conclusion is "that for peas grown upon ordinary garden soil, peat, clay, or loam inoculation with nitragin is useless and superfluous, whilst upon gravelly soils a small increase in crop results from its use."[13]—C R. B.

ELIZABETH DALE[14] has studied the aerial tubers which are often very prominent in species of Dioscorea, notably *D. sativa*, in which they are said to become six or more inches in diameter. A study of their origin seems to indicate that they are stem structures, with conspicuous powers of propagation. In fact, the author ventures the statement that "the abundant formation of auxiliary tubers in many species of Dioscorea seems as if it were connected with the fact that these plants do not appear to form seed readily."—J. M. C.

DUSÉN has studied the byrological collections of the Swedish polar expedition under Dr. A. G. Nathorst in 1899. The localities visited on east Greenland extend from Pendulum island (74° 40′ N.) to Cape Stewart (70° 30′ N.), about 150 miles north and south of Cape Parry. The island of Jan Mayen was also visited. In this work he has had the assistance of Dr. H. W. Arnell on Bryum and Plagiobryum, and of Herr C. Jensen on Dicranum and Sphagnum. *Bryum subnitidulum*, *B. Dusenii*, *B. minus*, *B. Groenlandicum* and *B. Jan Mayense* are described by Arnell as new species, and the sporophyte of *B. obtusifolium* is fully described for the first time.[15]—C. R. B.

IT WAS OBSERVED by Sachs that when orthotropous roots, not too young, are inverted, they do not return to the vertical but become plagiotropous. Němec finds a satisfactory explanation[16] of this in the alteration of the receptive apparatus described in his previous paper,[17] thus confirming his views as to the nature of the perceptivity of typical roots, as well as Noll's idea, arrived at from theoretical considerations, that alterations in the response to directive stimuli have their source in an alteration of the receptive structure. He has observed, coincident with this induced plagiotropism, a change in the topographic relations of the quality of the sensitive plasmic layer. The difference between the original and the newly assumed structure is just the difference between that found in orthotropous roots and normally plagiotropous ones.—C. R. B.

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[13] Annals of Botany **15**: 511–519. 1901.

[14] On the origin, development, and morphological nature of the aerial tubers in *Dioscorea sativa*. Ann. of Bot. **15**: 491–501. *pl. 26*. 1901.

[15] Bihang till Svenska Vet. Akad. Handl. **27**: 1–71. *pls. 4*. 1901.

[16] Berichte deutsch. bot. Gesells. **19**: 310–313. 1901.

[17] Jahrb. f. wiss. Bot. **36**: 80. 1901. See also BOT. GAZ. **32**: 145. 1901.

A SHORT TIME since reference was made in this journal to the question of nomenclature in phytogeography.[18] It is interesting to read in this connection the translation of Professor Flahault's address at the Paris Congress[19] of 1900. While many may object to the arbitrary usage of the various terms suggested by Flahault, all will agree that the general questions at issue are made clearer, and we shall await the more impatiently the final decision of a competent committee. It seems questionable to the reviewer, however, whether the nomenclature problem can be settled by a committee, or even a convention. An arbitrary set of terms often acts to prevent a real advance of knowledge, if strict adherence is given to them. Already the terms zone, region, and association have rather definite meanings in the minds of active phytogeographers. Even the much vexed word "formation" is being more commonly used in the original and broader sense, as more inclusive than the word "association." Perhaps other terms also will become more definite in a perfectly natural way.—H. C. COWLES.

W. H. LANG in a late paper[20] has given a preliminary account of some experimental work on wild plants of a species of Anthoceros, in which he has demonstrated that by mutilating very young unopened sporophytes and bringing the cut surfaces in contact with soil under certain conditions of moisture, temperature, and light, bud-like outgrowths are produced from the vegetative cells that lie between the sporogenous region and the external layer. The cells in this region are the least specialized of all in the capsule. They become to some degree isolated in position by the decay of the surrounding tissue. The general sequence of the early divisions in the cells giving rise to the so-called prothallial growths are said to be "closely parallel to the early stages of germination of the spores of Anthoceros." His cultures were carried no further than to the production of a "bud-like stage," which produced rhizoids. The result would he more convincing if he had obtained flat prothallia bearing reproductive organs. This is the first discovery of apospory recorded for any liverwort, although found in a number of mosses and ferns.—FLORENCE M. LYON.

THE IMPORTANT WORKS of Stahl and of MacDougal and Lloyd on mycorhiza have been reviewed in this journal.[21] Mention should also be made of the work of Hesselman[22] on the mycorhiza of arctic plants. Boreal forms have been but little studied in this connection, and it might be supposed that the more xerophytic climatic conditions would work against the root fungi. Many plants, however, are found to possess mycorhiza in considerable abundance. Salix, various ericads, Dryas, Diapensia, and other species appeared much like more southern forms. W. Magnus has made an important cytological contribution[23] to the mycorhiza literature. He finds that the endotropic mycorhiza of Neottia is of two types, which differ in position, structure, and function. Four to six layers of cells immediately within the exodermis contain fungal hyphae. In the outer and inner layers of these cells the hyphae are thin-walled, and the fungi are digested by the host plant; ultimately the fungal threads degenerate, forming masses which also contain parts of the cell protoplasm. These masses Magnus regards as excreted products. In contrast to the above the more centrally located hyphae are thick-walled and remain vigorous throughout, not being digested by the host; these hyphae have haustoria and are regarded as parasitic on the orchid. This study thus gives still another view as to the significance of endotropic mycorhiza. Magnus treats in detail the cytology of the hypertrophied host cells, and at the close of the paper gives an excellent bibliography of the mycorhiza literature.— H. C. COWLES.

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[18] BOT. GAZ. **31**: 361. 1900. [19] Bull. Torr. Bot. Club **28**: 391–409. 1901.

[20] On apospory in *Anthoceros laevis*. Ann. of Bot. **15**: 503–510. *pl. 27*. 1901.

[21] BOT. GAZ. **30**: 68. 1900.

[22] Bihang till K. Svensk. Vet. Akad. Handl. **26**:—. 1900. (See Bot. Centralb. **86**: 239. 1901.)

ITEMS OF TAXONOMIC interest are as follows: E. L. GREENE (Pittonia **4**:285–320. 1901) has described 17 new species of Viola, 12 of Cerastium, 5 of Rumex, 8 of Lesquerella, 3 of Draba, and 7 of Lacinaria.—J. K. SMALL (Torreya **1**: 73–75. 1901.) has discussed Juncoides in the southeastern states, describing a new species; has described (*idem* 97) a new Crataegus from Florida; also (*idem* 107–108) a new Chamaelirium; and (*idem* 67) a new Alleghanian Rudbeckia.—E. P. BICKNELL (*idem* 102–105) has described 2 new eastern species of Lespedeza.—B. D. GILBERT (Fern Bull. **9**: 53–54. 1901) has described a new Asplenium from Kamchatka.—F. S. EARLE (Muhlenbergia **1**: 9–17. 1901) has written upon some fungi from Porto Rico, describing 11 new species and 1 new genus (*Cercosporidium*) of the Dematiaceae.—W. N. SUKSDORF (Bot. Monatss. **19**: 91–93. 1901) has described new species of Sisyrinchium, Potamogeton, Juncus, Deyeuxia, Melica, and Equisetum, from Washington.—THEO. HOLM (Ottawa Nat. **15**: 110–111. 1901) has described 3 new Canadian species of Gentiana.—WILDEMAN and DURAND (Bull. Herb. Boiss. II. **1**: 839. 1901) have described a new genus (*Bosqueiopsis*) of Urticaceae from the Congo region.—SCHMIDLE and WELLHEIM (*idem* 1007-1012, *pl. 13*) have described a new genus (*Rhodoplax*) of Pleurococcaceae.—H. MIEHE (Ber. deut. bot. Gesells. **19**: 434–441. *pl. 21.* 1901) has described a new genus (*Crapulo*) of marine Flagellates.—J. MATSUMURA (Bot. Mag. Tokyo **15**: 67. 1901) has described a new Formosan genus (*Alniphyllum*) of Styracaceae.—G. LOPRIORE (Malpighia **14**: 435 and

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[23] Jahrb. für wiss. Bot. **35**: 205–272. 1900.

448. 1901) has described two new African genera (*Argyrostachys* and *Sericostachys*) of Amarantaceae.—H. and P. SYDOW (Hedwigia Beibl. **40**: 62–65. 1901) have described a new African genus (*Hapalophragmium*) of Uredineae.—FR. FEDDE (Engl. Bot. Jahrb. **31** : 30–133. 1901) has taken up the Nuttallian genus Mahonia, recognizing 37 species, 7 of which are new.—SCHMIDLE (*idem* **30**: 246, 247, and 253) has described two new African genera (*Myxoderma* and *Chondrogloea*) of Stigonemataceae, and a new African genus (*Chaetonella*) of Cladophoraceae.—J. K. SMALL (Bull. Torr. Bot. Club **28**: 356-361. 1901) has described 8 new shrubs and trees from the southern states, and also a new genus (*Brayodendron*) to include *Diospyros Texana;* and has also (*idem* 451-453) discussed *Dasystoma flava* and some related species, describing two as new.—R. M. HARPER (*idem* 454–484) has described new species of Rhynchospora, Viola, Dicerandra, and Baldwinia, from Georgia.—V. S. WHITE (*idem* 421–444. *pls. 31–40*) has published a revision of the Tylostomaceae of North America, describing 10 new species and including one new genus (*Dictyocephalos*) described by L. M. Underwood.—P. A. RYDBERG (*idem* 499–513), in continuing his studies of the Rocky mountain flora, has published new species of Trifolium, Vicia, Primula, Cuscuta, Monarda, Castilleia, Pentstemon, Sambucus, and of 9 genera in the Compositae.—GEORGE MASSEE (Jour. Linn. Soc. **35**: 90–118, *pls. 4–5*. 1901) has published the second part of his redescriptions of Berkeley's types of fungi, including all the species of Discomycetes and Hysteriaceae of which type specimens exist at present in the Kew herbarium.—J. M. C.